

10/560895

IAP20 Rec'd PCT/PTO 16 DEC 2005

**THE FOLLOWING ARE THE ENGLISH TRANSLATION  
OF ANNEXES TO THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT (ARTICLE 34):**

Amended Sheets (Pages 1a and 1b)

**Method for Monitoring an Oil and Gas Lubricating Device  
With the Aid of a Striae Sensor**

The invention relates to a method for monitoring an oil and gas lubricating device, with which an oil film, while forming striae, can be conveyed by an airflow along a wall of a supply line to a lubrication point, in which method the temporal change in the striae is detected by a striae sensor, and a striae signal is generated that is representative of the temporal change in the striae.

Oil and gas lubricating devices are widespread and are used, for example, for supplying lubricant to high-speed spindles in modern machine tools. An unnoticed malfunction in the lubricant supply can lead to a malfunction of the device to be lubricated, e.g., a machine tool, and therefore to high consequential costs and problems, such as loss of production, for example. This clearly shows the need for a capability of automatically monitoring the supply of lubricant by an oil and gas lubricating device, because subjective, visual monitoring, for example, by an operator, is too uncertain. Customary oil and gas lubricating devices are minimal quantity lubrications, in which the oil, instead of flowing in streams, flows only on the order of individual drops. These drops are pulled apart by an airflow and, in the form of a fine oil film, also called striae, conveyed along a wall of a supply line in the direction of a lubrication point, e.g., a spindle bearing. Such a limited quantity of oil hinders the monitoring of the lubricant supply by the oil and gas lubricating device that can be carried out with a justifiable effort.

US 6,131,471 describes a cooling system with a compressor, whose bearings are lubricated by an oil lubricating device. An optical lubricant sensor is arranged in a supply line of the oil lubricating device for monitoring a sufficient supply of lubricant.

From DE 44 39 380 A1, a lubricating device for minimal quantity lubrication is known in which a sensor monitors the lubricant flow and records a temporal change in the lubricant flow. For example, the sensor can be a light barrier, whose detection beam penetrates the lubricant flow and its transparently constructed supply line diametrically and whose detection beam is characteristically changed by the lubricant flow. A photoreceiver generates an electric striae signal that is representative of the lubricant flow or the striae and from which the presence and quantity of the lubricant flow is derivable.

A further example for a method for monitoring an oil and gas lubricating device from the state of the art is described in WO 01/36861. In the method described in this publication, the temporal change in the lubricant flow is also registered by a striae sensor, and the striae